AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 44. DECEMBER, 1898.

CONSIDERATIONS IN GATHERING FORESTRY STATISTICS.*

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The call for statistics regarding our forest resources, their extent, consumption, and duration in connection with the tariff discussions has revealed the fact that we have but little if any reliable information on the subject, and has accentuated the need of more accurate knowledge.

In the expectation that an attempt may be made to secure the necessary funds for the purpose of getting this information, either in connection with the Census or independently, it may be of practical interest to point out what forestry statistics are and what their gathering involves.

Before approaching the subject of this paper I may be allowed to state my conception of the work of a statistician in general, since I have observed that misconceptions, even among so-called statisticians, seem prevalent.

The statistician to my mind is more than an enumerator. If he wishes to fulfill his true function he cannot, as a prominent official statistician once declared that he did, "count hogs, dogs, and logs alike." The sum totals thus obtained would probably be of little practical value. If, as I conceive,

* Presented at the Meeting of the American Statistical Association in Washington, May 27, 1897.

the statistician is not only a recorder of the results of the past progress of development and civilization, but also acts as a guide for future progress, as an auxiliary to the economist and legislator, he must have more than numerical knowledge of the matter which he subjects to statistical inquiry; he must be conversant with its meaning and position in the household of the nation and its relative importance; its relation to other fields and its nature in general. To be sure, facts, and facts only, are the object of the statistician, but facts in relation, concrete facts, which will give a picture of the condition of any one phase of our civilization, of our industrial life, intercourse or development; facts which may serve as a basis for the discovery of the law of progress, which will give us insight into the causes of present conditions and means of judging, if not forecasting, and directing future conditions. His information, in other words, must lend itself to *statical* use.

Hence, in the gathering of these facts, if they are to be useful, the object for which they are to be used cannot entirely be overlooked by the statistician, and his method of investigation and statement will, in part, at least have to be formulated with this object in view to insure adequacy of the results of his inquiry.

There are some facts that can be ascertained by mere enumeration, and the methods of the census-taker suffice for these. There are other facts which are beyond the reach of the census-taker and his methods; facts which require the employment of an expert and special methods.

I claim, then, that in the first place the statistician who proposes to ascertain facts relating to forestry matters must have some knowledge of the forest and its nature, and of the object, relations, and methods of the forest industries; and, secondly, he must be sufficient of a forestry expert to be able to devise methods which will produce adequate results from the inquiry.

It may be well also to point out that the absolute truth can rarely if ever be found. Truth is only relatively true. Almost all statistics, especially when referring to a large field, *are* only approximations to a greater or smaller degree, and in most fields, by the nature of things, even with the best methods, *can* be only approximations. As we will shall see, forestry statistics, like all crop statistics, are of this class.

The approximations may be closer or less close according to the methods pursued, and here again the object in view will determine the choice of methods. We must make up our mind as to what degree of accuracy and approximation we may be satisfied with before starting our investigation. Thus the statistics which the census statistician gathers to present a picture of our conditions as a nation would never satisfy, and should not attempt to satisfy, the needs of a commercial transaction.

Forestry is the rational use of the soil for wood crops just as agriculture is the rational use of the soil for food crops. Rational use of the soil requires a division of the same and the assignment of different portions to food crops and to wood crops. In the well-ordered State the soils most fit for agriculture are devoted to systematic cultivation of food crops as fields and pastures; but just so should the non-agricultural soils, the *absolute* forest soils, be devoted to the systematic cultivation of wood crops. When such a disposition or distribution and use of soils is accomplished the highest state of civilization from the cultural point of view is reached. Since, then, the statistician, especially the census statistician, has for his final task to measure the state of our civilization, the distribution of farm and forest area forms a proper object of his inquiry.

Wood growth fulfills a twofold function; not only does it supply materials most necessary to civilization, but it forms a condition of the earth's surface, which is known or believed to have a determinative influence on other cultural conditions, namely, those of climate, soil, and waterflow. Especially in

the last two directions the forest cover in certain situations, on hills, slopes, and mountains, exercises a potent influence in preventing erosion of soils, and in regulating the drainage of rain and snow waters, thereby decreasing the excess and frequency of high and low water stages, both in the water channels and the subterranean ground waters.

The forest, therefore, forms a special cultural element aside from the material which it supplies, and hence forestry statistics must have two objects in view, namely, to furnish information regarding the material supplies of the forest resource, and information regarding its conditions with reference to the other mentioned conditions which the forest cover influences or predicates. We may at once distinguish "supply" forests and "protective" forests. As a rule the two functions are or should be exercised simultaneously, but it is possible that there exist, and in reality there do exist, many forest areas which, while protective in an efficient manner, as supplies are of no significance. Hence, the knowledge of the forest area of a country by itself is meaningless, either as far as wood supplies or cultural condition is concerned; its character and conditions and its topographical location must also be known.

To ascertain the area of a forest cover would appear a simple task. Yet even here the indefiniteness of the term "forest" makes it necessary to exercise judgment, and it would be difficult to direct a mere enumerator with some definite rule by which to segregate. To be sure, the whole earth almost is a potential forest, *i. e.*, is capable of supporting and eventually may cover itself with tree growth, but from the point of view of present statistical inquiry the present condition and value of the woodland or its prospective condition and value within the present and perhaps next generation, either as a present or prospective supply forest or as a desirable protective cover, can alone enter into consideration.

It will, then, be necessary for the statistician to have a conception as to what to consider as forest growth, and, furthermore, classification of the area is necessary, based upon topography, soil conditions, kinds composing the wood growth, density and age of the same.

I may stop long enough to try to define what a forest is. The English lexicographers seem to consider large extent and virgin or natural growth, an absence of cultivation, as distinctive attributes to the word "forest," while the word "woodlands" is vaguely and inconsistently defined as the generic term for land covered or interspersed with trees and of *less extent* than a forest, or else land on which "trees are suffered to grow either for fuel or timber" (Webster), accentuating thereby relation to the uses of man.

I believe that etymology, linguistic sense, and actual use-age, especially in later times, since the subject of forests and forestry has become prominent, would warrant us in defining more precisely: *woodland* as the general or generic term for land naturally covered with woody growth in contradistinction to land not so covered; *forest* as the restricted or specific term, namely, woodland, whether of natural growth or planted by man, considered in relation to the economic interests of man, and from the standpoint of national economy as an object of man's care; a woodland placed under management for "forest purposes," and, we may also add, exhibiting "forest conditions." These last limitations are important.

By the first restriction we exclude at once those lands covered with trees or woody growth which serve other than forest purposes, such as coffee plantations, orchards which are grown for fruit, roadside plantings and parks which are planted or kept for shade and ornament, windbreaks, consisting of single rows of trees which, although like the other conditions of tree growth mentioned may answer some functions of forest growth, are not primarily intended to fulfill forest purposes, and lack what I have called "forest conditions." These imply a more or less exclusive occupancy

of the soil by arborescent growth, a close stand of trees, as a consequence of which a form of individual tree growth results unlike that produced in the open stand, and a more or less dense shading of the ground which excludes largely the lower vegetation.

By so much as these conditions are deficient by so much does the forest fail to deserve the name and to fulfill its economic functions, namely, as a source of useful material, and as a factor in influencing climatic soil and water conditions.

As an example of a disappointing piece of work in this line we may take the maps of Massachusetts and Connecticut, prepared by the Geological Survey, on which the forest area is noted all in one color. Who knows anything from the economist's point of view of the forest area of the State by looking at this map? Mere waste brush lands which for a generation or more may remain valueless, either as supply or protective forest, are treated the same as any old timber growth, furnishing logs to the mill and cover to the ground. Without classification and additional notes the map conveys to the uninitiated the idea that the State is well provided with valuable forest growth, indeed is superabundantly so provided; and yet we know that there is no timber worth speaking of to be found in these States, that the composition and condition of much of the woodlands does not promise much for the future in this respect, and that, even as a protective cover, they are ineffective. The information thus stated is a snare and a delusion. I do not question the good intention in thus segregating the lands which are not used agriculturally, but the usefulness of the data from the forestry point of view is not apparent.

To enable us to estimate cultural conditions merely it is desirable to know whether the woodland is located on non-agricultural or agricultural soils, on slopes and mountain tops (which to be sure the topographic contour lines allow in part to judge), and the condition of the cover, whether open or

dense, and even whether old or young, and in what stage of development.

From the standpoint of supplies it becomes necessary also to know something about the composition, for a large part of the trees growing in a woodland are weeds, — useless and worse than useless; further the age of valuable supply areas, and the quantity of material either on hand or prospective needs to be known. To be sure no mere topographer and surveyor, however excellent a man, and no mere enumerator, is capable of furnishing such information about a crop whose nature not even those who harvest it understand. It is only a professional forester who can judge the economic value of such a crop and describe its conditions in a manner which will permit a diagnosis of the question of supply or even cultural condition. In the case of agricultural use of the soil or agricultural crops which ripen and are harvested the same season they are put in the ground the matter is much more simple; the opinion of the owner as to the prospective quantity or value or the opinion of any agriculturist can be readily accepted as approximating the truth sufficiently.

In considering a forest crop, especially one in natural condition, such as we have to deal with where forestry, the art of growing useful wood crops, is not yet applied, we must keep in mind that of the many trees growing only a few kinds serve our industrial purposes, the rest, excepting as they may serve as soil cover or firewood, are weeds.

As a result of the method of culling, which our lumbermen have pursued in harvesting the valuable virgin growth, we shall find that large areas, which to the unprofessional eye appear an unbroken forest, contain in reality hardly any kinds or individual trees fit for industrial uses. Worse, by this gradual culling out of the useful kinds, the ground is left to the occupancy of the tree weeds, which must first be removed to give room for a valuable forest crop, just as the forest had to be removed to make room for the agricultural use of the soil. Thus the two States of Massachusetts and

Connecticut, for which the United States Geological Survey maps show one-half or more of their areas under forest, do not contain any considerable areas on which wood useful in the arts is growing. Not only is the number of tree weeds usually in preponderance, but the valuable hardwoods are mostly sprouts from the stump, which, growing rapidly for the first 20 or 30 years, cease to grow early, and rarely attain log size in a reasonable time. Nothing but seedling forest growth will satisfy the demands of our wood industries.

We see, then, that statistics of forest areas, even if we are careful to rule out all mere waste brushlands, which in generations to come will not assume forest aspect, are of little or no use for any practical purposes unless we know also something of their condition. This is true not only from the crop aspect of the forest cover but also from the protective aspect. For whether the forest cover is capable of influencing climatic, soil, or water conditions depends entirely upon its own conditions.

A few scattered trees and shrubs over a surface robbed by fire of the litter and vegetable mould, which is the essential feature of a forest floor, trampled by sheep and cattle either into a compact smooth thrashing floor or into an impalpable dust, can hardly be expected to be of the same value as a dense stand of timber interposing impenetrable shade to the drying influences of the sun, an impenetrable barrier to cold and hot blasts, with a floor of vegetable mould, the accumulation of centuries, which keeps the soil below porous and open, retains the water and gives it up gradually to the lower strata and lower levels instead of turning it into rapid surface drainage. If merely as a soil cover the value of a forest depends upon its condition, how much more so when considered as a crop.

Of all the kinds of wood in which our country abounds the conifers, and especially the pines, are the most useful, the most generally used and the most difficult to do without. So true is it that our civilizations are built of pine and its

congeners that such countries as Brazil and Australia, both heavily wooded, are forced to become large importers of our coniferous article. Two-thirds to three-fourths of all the wood of log size which we use is of this description. Hence, the statistician ought to give special attention to this part of our resource, its present condition and future promise.

If wood alone were our need we might dispense with forestry and forestry statistics; for supplies of wood are, and for a long time will be, plentiful through nature's unaided efforts.

If only hardwoods, so-called, were needed we should still be able to defer our concern regarding supplies, for the reproduction of these accomplishes itself by seed as well as by sprouts from the stump. The chances are, therefore, at least double those of the conifers, which reproduce only, or almost only, by seed. It is coniferous wood of good quality and serviceable size that our civilization is mainly concerned in, and as this is rapidly culled from the virgin forest and under the careless treatment which our woodland areas receive does not reproduce itself as rapidly, while the young growth suffer much more severely from the forest fires than the hardwoods, the attention of the economist and statistician is or should be naturally directed to this important part of the question first, to this most needful and useful forest crop.

There are two considerations in which a forest crop differs from any other kind of crop, and in which forestry, the industry concerned in wood production, differs from any other industry and renders it *sui generis* in its technical and financial as well as economic aspects. These are the time element in the production of the crop and the indeterminateness of the maturity of the crop.

We must repeat again and again that it is not simply trees or wood that the forest grower, the lumberman, and the wood consumer desire, but wood of given qualities; wood of size and fit for industrial uses. To produce the timber of size

from which our lumber is cut at present has taken from 150 to 200 and more years, and even with the best skill in aiding nature's efforts a serviceable pine log may not be expected in less than 75 to 100 years, and *then* we shall have to scale down considerably our requirements as to quality from our present standard. The time to harvest the crop is not a matter determined by the season, as in agricultural crops, but by two variable considerations, namely, technical or financial, either the serviceableness of the size of the log or the profitableness of cutting it, or both. The size when a log is serviceable depends not only on the use to which it is put, but also on the practice of the market and mill, and these influence, with other considerations, the question when it is profitable to cut it. The statistician cannot help considering these matters, for whether the mills are sawing only logs 10, 12 or 14 inches in diameter, as was the practice in the pineries in 1880, or whether they have adapted their machinery and methods to scale down to 5 inches, as is now done in some parts of Maine and elsewhere, must make a difference in his statement of supplies at hand or becoming available.

The question of profitableness in our country has so far been determined only from the standpoint of the harvester, the cost to the logger and mill man, — by no means from the standpoint of the forest owner or wood producer, and much less from the standpoint of national economy. Of the wood standing on an average acre of virgin growth which is being cut for lumber under our present methods, at best not more than 50 per cent of the total wood volume, and usually less than 20 or 25 per cent, is utilized; the balance is waste or left to grow, the waste being due to avoidable and unavoidable causes on account of absence of market for inferior parts, tops, etc., on account of defects, careless felling, uneconomical handling, etc.

Thus an interesting account is given by the Forest Commissioner of Maine with regard to a typical acre of spruce land: —

Original stand, 52 trees of 12 in. and over, . . .		1,360 cub. ft.
214 " of 3–12 in.		1,440 " "
		2,800 cub. ft.
Utilized 36½ per cent in logs hauled, ... which in the mill may furnish between 400 and 500 cub. ft. in the shape of lumber.		1,020 cub. ft.
Wasted 11 per cent in stumps and tops, ...	340	
Destroyed in cutting, 17 per cent.	480	
Blown down, 17 per cent.	480	
		1,300 cub. ft.
Left to grow, 17 per cent, ...		480 " "
		2,800 cub. ft.

The layman and the average inexpert statistician can hardly realize how much difference the size of the log makes in the output at the mill. Thus in the average mill practice, while from a log thirty inches in diameter 72 per cent may be realized in the lumber, a log of ten inches will yield only 35 per cent of its volume in the shape of lumber, and of a log of five inches diameter, the smallest now cut, three-quarters more goes into the slab and saw-dust pile. A consideration of this kind will forcibly impress the statistician and economist with the fact that whatever small profit the logger may make from the cutting of small trees, it is an enormous loss to the national capital, for the available quantity as well as the value of the accumulated wood crop increases by the mere annual accretions of wood, in geometric, not in arithmetical, ratio, for quite a time.

The lumberman of the present day is not a wood producer; he is merely a harvester,—a miner taking the pay ore, a butcher slaughtering the herd without concern of replenishing it; he is not a breeder, not a forester. What he leaves he leaves simply because it does not pay to take it; not because he expects that it will grow into serviceable material. For reproduction he not only makes no provision, but by his methods he prevents it, and forest fires do their part to aid him.

The small trees left by him, which are not always young trees by any means, but "runts" that have struggled under

the shade of the taller trees, sometimes for a hundred years, grow on after the first logging, and after some time there are again a few trees which have attained a size fit for the saw, and the logger returns for a "second crop," and he talks about the so-called "second growth" as if it were reproduction. Thus he claims, for instance, that the spruce forest in Maine renews itself every 20 years. As a matter of fact in many if not most cases there is no renewal or hardly any; few new trees start to grow, only those left of the first crop as found produced by nature, having been given light, have grown to serviceable size. Reproduction takes place now and then under favorable conditions, but wherever a species is culled from a mixed growth, and most of our woods are so culled, it is only a question of a short time when it is practically exterminated, the shade of the unserviceable trees, the tree weeds that were left preventing or reducing the chance of reproduction.

The logger or lumberman of today is concerned only in the quantity of immediately serviceable log timber. He has hardly yet given a thought to the future. But the economist, and his colaborer the statistician, if not the harvester, must pay attention to the conditions of the growing crop as well as of the grown crop.

The quantities available for present mill use could be closely approximated either by actual measurement or estimate of the standing timber by expert estimators. A really good estimator can come within 10 to 20 per cent of the more exact measurements, and produces invariably an underestimate, for he has usually been employed by purchasers of timber, and for safety's sake he must remain below the truth. If he does his work conscientiously he ascertains, by a few measurements in every new territory he enters, and, preferably, every day he is at work, to keep his eye in training, the quantity produced by an average-sized tree, and then counts the serviceable trees, and by multiplication he arrives at the total for each 40 acres, a convenient area to

handle, making allowance for defects (which is a very variable quantity). It is apparent that such a method, which is the one employed for commercial transactions, would hardly be practicable for mere statistical purposes; the cost of such a canvass, which cannot be less than 2 cents per acre for all timber land, forbids its use over an area counting by millions of acres.

Again we must realize that such statistics as the census maker can gather are not meant for commercial use directly. Approximations only are wanted within a reasonable degree of accuracy, such as the economist and legislator require to form a judgment of general conditions. In the present case we shall have to devise a method of averages applicable over large areas of typical forest growths. Needless to say, these averages must be determined with care by competent experts able to select and recognize types and classify the areas accordingly.

If there is difficulty and need of expert judgment in determining quantity and value of standing merchantable timber which is within the actual vision of the estimator, how much more difficulty must be found, and expert knowledge be needed, to judge the prospective quantity and value of the unperfected crop which is the promise of the future. Here, too, average methods must be devised, based upon the ascertainment of the rate of growth for typical areas. To be sure different degrees of accuracy in the method can be employed according to the greater importance of any or one part of the resource. Thus it would be desirable to ascertain the conditions of our coniferous resource with more precision than of our hardwoods.

This paper is intended to be merely suggestive, preliminary —not exhaustive. We may, therefore, now only briefly summarize the knowledge which we might expect a tolerably satisfactory statistical inquiry into our forest conditions and forest resource to produce as a basis for statical purposes.

1. The area of forest cover, classified according to —
   (*a*) location with regard to topography, hydrography, soil conditions, means of transportation, markets;
   (*b*) composition, *i. e.*, relative occurrence of merchantable kinds;
   (*c*) condition as to density and character of growth and soil cover, age, damage by fire, etc., treatment.

2. The value of the forest resource, both expressed in quantities of available or prospective crop material (the latter based on rate of growth), segregated by kinds and character and the money value as far as ascertainable; also with reference to protective functions and cultural significance.

3. The proprietary conditions; State, communal, institute ownership which promises greater stability as against private ownership; size of parcels owned individually, which predicates manner of treatment.

4. Prices of crops, and cost of production and harvest.

5. The market conditions and statistics of wood-consuming industries.

On this part of the inquiry which concerns itself with the harvest, disposal and use of the forest products, I have not enlarged, for there is little or no difference in the gathering of statistics of these industries from those of other industries, except perhaps that as many of the forest industries are carried on away from centers of production and as a side business in connection with other industries more careful search may be necessary to come nearer to the approximation of the truth. In this direction I believe the methods elaborated in the Eleventh Census with few changes, based on the experience of that census, may answer the purpose.

REVIEWS AND MISCELLANY.

LIBRARY OF AMERICAN STATISTICAL ASSOCIATION.

The following extracts from the Bulletins of the Boston Public Library explain the transfer of the collection of books of the American Statistical Association from rooms in the Institute of Technology to the Public Library: —

STATISTICAL DEPARTMENT. — The Library of the American Statistical Association has been received, in accordance with the following letter of gift and vote of acceptance, and is now in process of examination. When this is completed, and the material is in form to be consulted, notice will be given in this department of the Bulletin.

[From the Trustees' Records, June 16, 1898.]

AMERICAN STATISTICAL ASSOCIATION.

BOSTON, MASS., June 16, 1898.

To the Trustees of the Boston Public Library:

GENTLEMEN, — The American Statistical Association, of which General Walker was president for so many years, until the time of his death, and of which Colonel Wright is now president, has a valuable library of statistical works, especially rich in public documents of foreign countries . . . At the last meeting of the Association, held in April of this year, the Library Committee of the Association was given power to transfer the library to the Trustees of the Boston Public Library if they were willing to accept the gift, the only condition being that the purely statistical portion of the library should be kept together, and that members of the Association should have free access to the shelves of this collection . . .

Very truly yours,

(Signed) DAVIS R. DEWEY, *Secretary.*

Voted, that the above gift of the Library of the American Statistical Association be accepted, and that the Librarian arrange for the transfer of the material at such times and in such manner as may be convenient.

Division of Documents and Statistics.—A reorganization of the collections of documents is under way, in the charge of Mr. Worthington C. Ford, late Chief of the Bureau of Statistics of the Treasury Department, Washington. Material already on the shelves will be assembled, systematic effort made to complete the collections, and the scope of the whole increased. The Library of the American Statistical Association, the gift of which was noticed in the November bulletin, has been added to the collections belonging to the Library.

The Division will at no distant day be fully equipped for the service of the public. Not only are the issues of the United States government received, but the leading publications of the different States and municipalities are on file. The foreign reports of a corresponding character will be added, and special care paid to keeping the department in touch with the important problems of government now under discussion in Europe and America. Statistics on population, finance, commerce, transportation, migration, and colonies, among other topics, will receive special attention.

DEATHS IN CHILD-BIRTH.

An elaborate article on *Deaths in Child-birth in New South Wales*, by T. A. Coghlan, is published in the *Journal of the Royal Statistical Society* for September, 1898. The investigation is founded on the deaths and births registered in New South Wales during the four years 1893–96. In regard to the deaths from each confinement the information available covers only three years, 1894–96, during which there were 115,669 confinements and 813 deaths due to child-birth. Of these, 9920 were confinements of unmarried women. The following table relates to married women only: —

Confinements.	Births.	Deaths in Child-birth.	Confinements.	Births.	Deaths in Child-birth.
1	20,145	175	13	534	7
2	17,203	79	14	261	1
3	14,908	85	15	123	1
4	12,319	61	16	56	..
5	10,396	67	17	32	..
6	8,553	56	18	8	1
7	6,808	43	19	5	..
8	5,302	40	20	1	..
9	3,805	40	21	..	..
10	2,583	21	22	..	..
11	1,727	16	23	2	..
12	978	21			
				105,749	714

A table is also presented showing the probability of death during confinement as follows: —

Confinement.	Probability of Death during Confinement.	
	First Approximation.	Adjusted Figures.
1	0.008687	0.0087
2	0.004592	0.0066
3	0.005702	0.0055
4	0.004952	0.0052
5	0.006445	0.0052
6	0.006547	0.0057
7	0.006316	0.0064
8	0.007844	0.0074
9	0.010512	0.0084
10	0.008130	0.0097
11	0.009265	0.0118
12	0.021472	0.0142
13	0.013109	0.0168

The risk attending the first birth is greater than that of any subsequent one up to the ninth. The minimum risk would appear to be at the fourth, but the increase in risk at subsequent confinements may be due to the increased age of the mother and not to a loss of vitality or other cause. When ages are taken into account it is found that the risk attending upon the first birth is at a minimum at the

22nd or 23rd year, and, after five years, increases rather rapidly with age. Age is a great factor in the risk, but even with the increased age the risk attending the first confinement is greater than any subsequent one up to the ninth.

The following table shows the average number of children to women marrying at any age, the husband's age assumed to be five years older than wife's: —

Age.		Probability of Birth during the Year.	Children. Annually.	Total Average Number of Children to Women Marrying at Age in first column.
Female.	Male.			
20	25	0.445	0.4420	7.2217
21	26	0.428	0.4238	6.7797
22	27	0.413	0.3987	6.3559
23	28	0.398	0.3937	5.9572
24	29	0.385	0.3806	5.5635
25	30	0.372	0.3576	5.1829
26	31	0.358	0.3425	4.8253
27	32	0.346	0.3415	4.4828
28	33	0.335	0.3305	4.1413
29	34	0.327	0.3223	3.8108
30	35	0.318	0.3133	3.4885
31	36	0.311	0.3062	3.1752
32	37	0.304	0.2991	2.8690
33	38	0.297	0.2919	2.5699
34	39	0.289	0.2839	2.2780
35	40	0.279	0.2738	1.9941
36	41	0.270	0.2648	1.7203
37	42	0.258	0.2428	1.4555
38	43	0.245	0.2401	1.2127
39	44	0.228	0.2230	0.9726
40	45	0.200	0.1955	0.7496
41	46	0.169	0.1651	0.5541
42	47	0.125	0.1222	0.3890
43	48	0.095	0.0926	0.2668
44	49	0.070	0.0682	0.1742
45	50	0.048	0.0467	0.1060
46	51	0.030	0.0292	0.0593
47	52	0.017	0.0165	0.0301
48	53	0.007	0.0068	0.0136
49	54	0.004	0.0039	0.0068
50	55	0.002	0.0019	0.0029

The next table shows the probability of death from each confinement: —

Confinement.	Probability of Dying.	Probability of Living.
1	0.0087	0.9913
2	0.0066	0.9934
3	0.0055	0.9945
4	0.0052	0.9948
5	0.0052	0.9948
6	0.0057	0.9943
7	0.0064	0.9936
8	0.0074	0.9926

In the discussion which followed it was asserted that the maternal mortality in London was not nearly as high as that shown for New South Wales. A mortality of 1 per cent would be considered monstrous. If New South Wales were so unfortunate as to have a mortality of 1 in 121, something should be done.

NOTE ON THE TREASURY ESTIMATES FOR 1900.

At the second session of the 54th Congress there was appropriated for the expenses of the government in the fiscal year 1898, a year of peace, the sum of $433,069,740.* On the following year the appropriations for the same purposes would have been $453,661,078. The war appropriations increased this sum to $793,305,690. The Secretary of the Treasury asks in his estimates for the year 1900 the sum of $588,782,491. This is an increase of 36 per cent over the appropriations for 1898, and of 32 per cent over those for 1899. Almost every dollar of this increase is for unproductive expenditure. Of this increased expenditure the leading items are: —

	1898.	1900.	Increase.
Army,	$23,129,344	$145,119,432	$121,990,088
Navy,	33,003,234	39,114,652	6,111,418
Pensions,	141,263,880	145,233,830	3,969,950
Fortifications (home),	9,517,141	12,151,898	2,634,757

These four items account for an increase of $134,706,213 out of a total increase of $155,712,751, or 86 per cent.

Hardly a department of the government does not add items of cost incident to the control of the late Spanish possessions, but we need not stop to enumerate them.

* Post office appropriations and expenditures are omitted.

The government of the islands will be a military government. But no sums are asked to construct and equip the necessary coast and harbor defences necessary to such government; or for the improvement of harbors and waterways, cleansing of cities and towns, relief of the needy, and the many items of expense incident to the occupation of distant and unprotected possessions, populated by poor and untaught peoples, oppressed into insurrection, and undisciplined to control of any kind. The cost of administering justice will not be small; the actual rebellion of the people against our rule is a possibility, even a probability; and the sullen opposition of a home-rule element must be faced. The islands will not be self-supporting to the extent of providing for such contingencies as rebellion, and so the annual cost to the people of the United States must be increased, even as an insurance against an uprising.

Assuming that the War Department has asked sufficient for the mere occupation of the islands, and the enlarged military establishment for police purposes, it will be seen there are other large and uncertain items of cost unprovided for, and the annual appropriations will in future be nearer $200,000,000 in excess of those of 1898 than $155,712,751.

An annual increased expenditure of $200,000,000 means a continuance of "war taxation" and an addition of new taxes, or borrowing by the government to meet current expenses of government.

The total revenue from the two great and regular sources of income for the fiscal year 1898 was: —

From internal revenue,	$170,900,641
Customs,	149,575,062
Miscellaneous sources,	20,000,000
Total,	$340,475,703

The amounts derived from the sales of the Pacific Railroads, a windfall not to be repeated, brought the total income to $405,321,335. Compared with the appropriations for 1898 there would have been a deficit of $27,748,405; or excluding the sums received from the Pacific Railroads, one of $92,499,629. This on a peace basis!

Mr. Gages estimates the revenue for 1900 to be: —

Customs,	$205,000,000
Internal revenue,	285,000,000
Miscellaneous,	20,000,000
Total,	$510,000,000

giving a deficit of $78,782,491 for that year — a year of peace, with war taxation to produce revenue. Every dollar of additional revenue from customs and internal revenue will be swallowed up in unproductive expenditure incident to the occupation of the late Spanish islands.

Estimates of the Treasury err on the side of a favorable showing. Trade must continue in high prosperity to yield the amount expected, and the condition thus pictured is the best that can be shown. For every good year there will be one or more bad years, when the deficit will be increased. For the estimates of expenditure for 1900 are such as must continue for many years; the revenue is placed at the highest notch.

An average deficit of $100,000,000 a year will not be an excessive estimate. This means the taking each year from productive industry of a sum representing the interest (at 3 per cent) on $3,333,000,000, and is equivalent to adding that sum to the national debt, but with this difference: the bond of the national debt is redeemable after a certain number of years, but this new charge represents a perpetual debt.

The capital of the debt of the United States at the end of 1898 was $1,047,320,000. The new expenditure will be equivalent to increasing it to $4,380,000,000. The debt of France is $6,218,871,340; Great Britain, $3,203,868,395. This gives us the second largest debt in the world!

In 1898 the per capita rate of taxation for national purposes was $4.34.

On the estimates of Mr. Gage the rate in 1900 will be $6.36 — an increase of more than 46 per cent.

This rests on the assumption that the estimates are correct, and takes no account of the reduction in customs incident to the free admission into the United States of tropical products. This would result in an additional sum of $80,000,000 to be obtained by new taxes, or a burden of $1.04 on every head of population, to be paid in taxes other than the customs or internal taxes now in force.

But the country is now taxed at a war rate, and where are the new sources of revenue to be found to meet this demand for nearly $160,000,000 a year?

WORTHINGTON C. FORD.

NOTES ON VITAL STATISTICS.

Ville de Bruxelles. Service d'hygiène, son organisation, et son mode de fonctionnement. By Dr. E. Janssens. Brussels, 1898. Pp. 52; diagram and plates.

This report opens with a striking diagram, showing on pages facing each other the administrative work of the division of public hygiene and the progressive decrease in mortality in the city of Brussels between 1874 and 1896. This volume well illustrates what a board of health coöperating with a developing public opinion and advance in medical knowledge can do for the saving of life. The results are illustrated in the following table: —

Quinquennial Periods.	Population.	Annual Average of Deaths.	The Rate of Mortality per 1,000 Inhabitants.	The Annual Average of Deaths by Contagious Diseases.	The Rate of Mortality per 10,000 Inhabitants.
1867–71	170,000	4,965.8	29.2	848.6	49.9
1872–76	163,914	4,492.4	27.4	349.2	21.3
1877–81	165,366	4,180.0	25.3	252.4	15.3
1882–86	171,562	4,240.0	24.7	321.8	18.8
1887–91	181,046	4,019.6	22.2	257.4	14.2
1892–96	189,303	3,778.6	20.0	216.2	11.4
1897–	197,695	3,222	16.3	125.0	6.3

The work of medical inspection of schools is summarized.

The *Statistische Monatschrift* for June–July, 1898, contains an exhaustive article by Dr. Presl on Public Health in Austria since 1848. It is a complete review of mortality tables and statistics of various diseases.

The Statistical Office of Buenos Ayres, under the direction of Carlos P. Salas, has published a monograph entitled *Memoria Demográfica* for 1895 (La Plata, 1898) which contains several maps showing the density of population, its distribution, the distribution of foreign population, the distribution of marriages, births, illegitimate births, general mortality, infant mortality, and mortality by various diseases.

Marriages, Naissances et Décès en Suisse, 1871–90. Deuxième Partie: les Naissances. Published by the Bureau of Statistics, Federal Department of the Interior. Berne: 1897.

This is an exhaustive investigation of the statistics of births covering a period of 20 years. The particular topics discussed are still-birth, illegitimacy, multiple births, births classed according to viability, the fecundity of women, etc. There are 50 pages of textual analysis. The tables are supplemented by a series of tinted maps illustrating the various points considered.

The *Therapeutische Monatschefte* for September, 1898, contains an an article on *Serum Statistics* by Dr. Josef von Körösy, Director of Municipal Statistics of Budapest.

In the *Annual Report of the Board of Health of Cambridge, Mass., for the year ending December 31, 1897*, a summarized life table for Cambridge is presented: —

ANNUAL DEATH RATES FROM ALL CAUSES PER 1000 LIVING.

Age.	Males.	Females.	Persons.
All ages	18.15	17.13	17.63
0– 1 year	224.76	185.38	205.24
1– 2 years	81.59	101.88	91.76
2– 3 "	21.60	22.97	22.30
3– 4 "	22.98	18.68	20.78
4– 5 "	15.45	9.21	12.40
0– 5 "	74.12	65.13	69.61
5–10 "	9.13	4.10	6.59
10–15 "	3.19	4.41	3.79
15–20 "	3.41	7.53	5.44
20–30 "	6.32	6.63	6.47
30–40 "	9.87	7.52	8.67
40–50 "	9.31	10.29	9.83
50–60 "	23.81	16.82	20.02
60–70 "	48.08	31.20	38.44
70–80 "	78.81	78.59	78.68
Over 80 years	177.14	168.19	171.31

Fifth Annual Report upon the Births, Marriages, Divorces, and Deaths in the State of Maine for the year ending December 31, 1896. Augusta, 1898. Pp. 238.

The birth rates, marriage rates, and death rates are computed for 1896 on population of 1890. Of the births, 62.34 per cent were of

American born parents, as compared with 78.18 in Vermont, 31.53 in Massachusetts, 31.83 in Rhode Island, and 41.2 in Connecticut. The birth rate of all children, according to the returns, was 22.23. The divorce rate in Maine appears to be high. In 1896 there was one divorce in every 8.3 marriages solemnized; in Vermont one to 15.7; in Massachusetts one to 19.2; in Rhode Island one to 9.2; and in Connecticut one to 14.9.

LABOR INQUIRIES.

Labor Copartnership. Notes of a Visit to Coöperative Workshops, Factories, and Homes in Great Britain and Ireland, in which Employer, Employee, and Consumer share in Ownership, Management, and Results. By Henry Demerest Lloyd. Illustrated. New York. 1898. Pp. 351.

This is an extended account of a journey which Mr. Lloyd made in 1897 through various parts of England in order to learn exactly what was being done in the line of coöperative production. The work of the distributive stores in England is generally well known; of productive coöperation, however, there is ignorance. The author secured his information at first hand, visiting many places, talked with many directors and workmen, collected much ephemeral literature, and has presented his notes and statistics in a most convenient form. There are more than 150 productive establishments with an aggregate capital of over $5,000,000. The experiments described include copartnership farms as well as factories.

The *Office du Travail* of Belgium has undertaken the publication of a new annual entitled *Annuaire de la Législation du Travail.* The first volume, that for 1897, has just been issued (Brussels, 1898. Pp. xii, 390). This does not cover the whole range of social legislation, but is confined to laws concerning the organization of labor, the right of combination and of strikes, the right of association, arbitration, conciliation, labor contract, apprenticeship, wages, health protection of the laborer, inspection, laws relating to accidents and workingmen's insurance. The text of the more important laws is accom-

panied by a note in regard to parliamentary work or to official inquiries which have brought them about. There is also a detailed alphabetical index. The work promises to be of great value to students. One hundred and four pages are given to Germany, 25 to Austria, 60 to Belgium, 70 to Great Britain, 5 to Norway, 28 to the Netherlands, 15 to Russia, 12 to Switzerland, and 35 to the United States.

The French *Office du Travail* has published an *Album graphique* entitled *Salaires et Durée du Travail dans l'Industrie Française.* (Paris, 1897. Plates 29.) It includes maps by departments, showing the distribution of the working population under consideration, the average day's wages by male workmen within the field of inquiry, expenditures, and the movement of wages. There are also ingenious charts in the form of rectangles, circles, and curves.

In the *Report on Strikes and Lockouts of 1897* (London, 1898. Pp. c, 171) it is noted that the general plan of the statistics has been changed only in one minor point. This is the omission of the tables of very small disputes involving less than ten persons, or less than one day's stoppage of work, unless the aggregate duration of a dispute exceeded 100 working days. It was found that in 106 of the disputes in 1897 the number of work people involved was 1649 only, and that the aggregate was less than 2800 working days. Such disputes are regarded as too trivial to affect any of the results from a statistical point of view.

The report also contains an account of the work done by various agencies for settling disputes, the text of certain amendments terminating these, and specimens of the forms used by the department when making its inquiries.

No. 8, October 1898, of the *Labor Bulletin of the Commonwealth of Massachusetts* has a special article on *Hours of Labor in Domestic Service*, based upon data furnished by the Committee on Domestic Reform of the Woman's Educational and Industrial Union of Boston. In all, the number of returns received covered 184 different families, in which 289 persons were employed,— individual schedules being furnished for 245 of these.

EDUCATIONAL STATISTICS.

In the annual *Report of the Board of Education of New Jersey for the year ending June 30, 1897* (Trenton, N. J., 1897), there are some interesting statistics on the lengths of the terms of service and experience of teachers. From these tables the following summary is made: —

Number who had been teaching 1 year or more,	548
" between 1 and 5 years,	2,014
" between 5 and 10 years,	1,347
" between 10 and 15 years,	777
" between 15 and 20 years,	489
" between 20 and 25 years,	334
" over 25 years,	360

The table showing terms of service in the same schools is as follows: —

Number who have been teaching in the same school 1 year or less,	1,563
" between 1 and 5 years,	2,382
" between 5 and 10 years,	962
" between 10 and 15 years,	469
" between 15 and 20 years,	232
" between 20 and 25 years,	146
" over 25 years,	115

According to chap. 496, Acts of 1898, Massachusetts has made a change in the taking of the school census, to take effect in September 1899, so that the census shall be taken in September at the beginning of the school year. The law provides that the school census shall contain the names and ages of all persons between 5 and 15 years of age, and of all minors over 14 years of age who cannot read at sight simple sentences in the English language. Hitherto the census has been taken in May.

Part II, vol. 3 of the *Massachusetts Census for 1895* is devoted to statistics of schools and school property, libraries and reading rooms. Under schools, statistics are given for public, private, truant, and normal schools. Under libraries and reading rooms, tables show the number of hours open weekly, and the year in which the libraries and reading rooms were opened.

FINANCE AND COMMERCE.

The Bureau of Statistics of the United States Treasury Department has published a useful compendium entitled *National, State, Private, and Savings Banks; Bonds, Paper Currency and Coin; Production and Value of Precious Metals; Coinage, etc., 1789–1898.*

For example, tables show the specie circulation, capital, and number of banks from 1774 to 1804, the resources and liabilities of the Second United States Bank from 1817 to 1837, the number and capital of State banks at different periods from 1792 to 1834, and the number of banks and their principal resources and liabilities by States from 1834 to 1897 (31 pages). There has been a rapid increase in the number of State banks within the past few years. Statistics are as follows: —

1887	1,422	1893	3,579
1888	1,403	1894	3,586
1889	1,671	1895	3,774
1890	2,101	1896	3,708
1891	2,572	1897	3,873
1892	3,191		

Large increases are shown in West Virginia, Mississippi, Kentucky, Missouri, Ohio, Illinois, Michigan, Wisconsin, and the Western States generally.

There has recently been published by the *Institut des Sciences Sociales* an *Atlas de Statistique Comparée de la Monnaie Métallique et Représentation et de l'Histoire des Prix*, by H. Denis. This contains three plates, showing the production of gold and silver by kilograms from 1492 until the present time, the annual value of the gold and silver production for the same period of time, and the consumption of the precious metals since 1851.

Thirteenth Annual Report of the Kansas Bureau of Labor and Industrial Statistics, 1897. W. L. A. Johnson, Commissioner. Topeka, 1898; pp. 400.

In addition to the customary investigations in regard to industries, wages, factory inspection, etc., a special investigation has been made in regard to assessment and taxation in 30 counties, using as a basis nearly 4000 transfers of real estate having a selling value of over $4,000,000, together with comparisons of assessment and taxation on investments in manufacturing and industrial concerns consisting

of improvements, buildings, and machinery. This report is of special value, as furnishing abundant material, illustrating inequality of assessment in different portions of the same State. In Atchison County the proportion of assessed valuation to real or selling value ranged from 9 per cent to 53.3 per cent. An analysis of this portion of the report is added, written by Prof. Bemis of the Kansas State Agricultural College.

The October, 1898, issue of the *Monthly Summary of Commerce and Finance of the United States*, issued by the Bureau of Statistics of the Treasury Department, Washington, contains special tables on canal statistics. Statistics are given for traffic through the Suez Canal, Kaiser William Canal, Canadian Canal, St. Mary's Falls Canal, and the New York canals.

The English *Board of Trade Journal*, November, 1898, contains, on p. 522, an interesting map to illustrate the trade and shipping of northern Africa. Not only are the railways indicated, but the caravan trade routes through the Sahara desert. The map extends on the south as far as Timbuctoo, Gao, and Omdurman. The September and October numbers also contained articles and maps on the trade of the British, French, and German colonies on the east and west African coast. This series of articles will be of help in understanding the commercial importance of Africa to the European world.

The *Review of the Trade of India in 1897–98*, compiled by the Statistical Bureau of India, by J. A. Robertson (Simla, 1898, pp. 77), contains an interesting chart showing the course of exchange in India, and the price of silver in London from the beginning of 1893 to the end of August, 1898.

The November number of the *Street Railway Journal* contains the results of accounts kept by the Metropolitan Street Railway Company of New York City, on the cost of operating street railroads by electricity, cable, and horses for the year ending June 30, 1898. In brief, the accounts show as follows per mile: Cable, 16.42 cents; electricity, 10.23; horses, 17.87. An analysis of this report may also be found in the *Street Railway Supplement* of the *Commercial and Financial Chronicle*, November 26, 1898.

It is announced by the Secretary of the National Wool Association of Manufacturers that a third edition of the *Wool Book* will be published in February, 1899. The new edition will record the figures in regard to the imports of free wool, and also contain a large number of additional statistics not previously available.

In *Municipal Engineering* for November, 1898, p. 277, a table has been published, prepared by the committee on electric street lighting, for the American Society of Municipal Improvements, showing the cities in the United States which operate their own electric lighting plants at the present time. The table shows the cities with lamps of 2000 candle power, 1200 candle power, and smaller plants. Statistics of cost, price, etc., are furnished.

At the fifth annual convention of the American Society of Municipal Improvements, held at Washington, October 26th, a report was submitted by a Special Committee on Municipal Data which had been appointed the previous year. It is noted that the annual reports of municipal departments of different cities show great lack of uniformity. Much of this is due to the great differences in the methods of keeping accounts, and of beginning and carrying forward public works on account of variations in State laws, city charters, and local conditions. It is believed, however, that these variations can be reduced very greatly by a general agreement following as closely as possible forms of reports afterwards suggested. The committee subsequently presented form of water-works reports, sewerage reports, and street reports, and suggestions that forms for other lines of municipal work be prepared by experts in those lines. It is recommended that when the schedules are finally adopted by the committee, a resolution be passed by the Association recommending the adoption of the schedules by the Census Bureau of 1900. It is the opinion of this committee that a permanent census bureau should be established, and that the collection of municipal statistics properly belongs to such a bureau. The schedules of the reports suggested may be found on pp. 295–98 of the November number of *Municipal Engineering.*

In the *Twentieth Annual Report of the Board of Railway Commissioners of Iowa for the year ending June 30, 1897* (Des Moines, 1898), complaint is made that the Board has been unable to obtain certain statistics asked for of the different lines of railway. Some companies refuse or fail to return the desired information, assigning

as a reason that they cannot comply with the request of the Board, except upon what is known as a mileage basis, and suggesting that statistics upon such a basis are not reliable, or are misleading. It has been found practically impossible for the Board to obtain from the reports furnished by railways operating lines through the State, and within other States, reliable statistics that would enable it to determine the earnings of that part of the line operated in Iowa. Where the officers of the companies have attempted to give this information it has been upon a mileage basis of their entire lines regardless of population of territory or traffic carried.

In the *Annual Report of the Inspector of Finance of the State of Vermont, June 30, 1898*, it appears that the aggregate deposits in the savings banks and trust companies were $34,071,721, an increase of $1,471,094. The total number of deposit accounts was 108,511, of which 12,940 belong to non-residents. There were 2569 accounts of over $1500 in the banks. Twenty-two savings banks paid 4 per cent interest, and one $3\frac{3}{4}$ per cent. The Inspector of Finance recommends that dividends be limited to $3\frac{1}{2}$ per cent until 15 per cent surplus has been accumulated.

MISCELLANEOUS.

At the National Convention of Charities and Corrections, held in New York in May, a committee was appointed to revise the national statistical blank which was originally prepared some ten years ago. This committee has now reported, and presents the following form: —

CAUSES WITHIN THE FAMILY.

- Disregard of family ties. (Desertion, neglect to contribute by children, brothers, sisters or other natural supporters.)
- Intemperance. (Abuse of stimulants or narcotics.)
- Dishonesty or other moral defects.
- Lack of thrift, industry or judgment.
- Physical or mental defects. (Blind, deaf, crippled from birth, insane, feeble-minded.)
- Sickness, accident or death.

CAUSES OUTSIDE THE FAMILY.

- Lack of employment not due to employé. (Changes in trade, introduction of machinery, hard times, strike or lockout, partial or complete shut-down, removal of industry, etc.)
- Defective sanitation.
- Degrading surroundings.
- Unwise philanthropy.
- Public calamity.

UNCLASSIFIED.

This form has fewer headings than its predecessor, and is regarded as more comprehensive. Lack of employment, due to the employé, and imprisonment, which is not a first cause, are omitted as causes of distress. Old age, large family, and no male support are omitted for the same reason. No heading is given for defective or misdirected education; this is regarded as too vague for practical use. Separate columns are provided for, showing chief causes and subsidiary causes. These new forms can be secured at cost from the New York Charity Organization Society.

Die Zahl im Kriege. Statistische Daten aus der neueren Kreigsgeschichte in graphischer Darstellung. By Otto Berndt. Publishers, Freytag and Berudt. Vienna, 1897. Pp. 174; folded map.

In these days of military interest this work will be of value not only for the reference library, but also for personal and immediate use. It is an attempt to show by diagrams the character of all the wars of this century, and the composition of the various armies engaged in the different campaigns and battles. The first part shows by a system of colored squares the exact years in which the several countries of Europe have been engaged in war during this century. For example, Austria-Hungary has had 17 years of war and 79 years of peace. Under each one of these checkered squares is given a list of the most important dates connected with these war periods. This is followed by a comparative table of the years of war and peace of the several countries of Europe arranged side by side. Here it is seen, for example, that Turkey has had 37 years of war, Spain 31, France 27, Russia 24, Italy 23, and England 21. These exclude the minor wars. The second part presents diagrams showing the relative strength of armies by a series of rectangles of various colors. Diagrams also show the number of killed and wounded in the several battles. Another part presents maps showing the lines of march of the armies in the great campaigns.

A Statistical Account of the Seven Colonies of Australasia, 1897–98. T. A. Coghlan, Government Statistician of New South Wales. Seventh issue. Sydney, 1898. Pp. xiii, 543.

This useful compendium is of great value, as not only showing the present state and resources of the Australasian colonies, but also because of the comparisons afforded in the experience of different groups

of English speaking people, which can be used for sociological illustrations. The editor declares that the conditions of life are more favorable in Australasia than in any other country. The excess of births over deaths is somewhat less than 19 per 1000. For the United Kingdom it is a little over 11 per 1000. Over 95 per cent of the population of the seven colonies are of British or Irish birth or descent, excluding the Chinese, who are not permanent settlers. Among the different topics considered are population, religion, education, social condition, commerce, railways, food supply, cost of living, and finance.

The Bureau of Statistics of Labor has published, pp. 1–192, vol. 3, of the *State Census of Massachusetts, 1895*. This volume is devoted to parent nativity. A brief summary shows that the percentage of the total population represented by persons of wholly native parentage in 1885 was 44.05; in 1895 it had become 38.23. The percentage of the population of wholly foreign parentage in 1885 was 47.36; in 1895 it had risen to 51.93. The persons having one parent native and one foreign comprised 6.17 per cent in 1885, and 8.13 in 1895. There is a small margin unknown. There are exhaustive tables showing the parent nativity by States and countries, and a special study is made of the parent nativity of persons 90 years of age and over.